

ART. VIII.—*Rare Foraminifera from Deep Borings in the
Victorian Tertiaries.*

Part II.

By

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(With Plate V.)

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In continuation of our former paper on "Rare Foraminifera from Deep Borings in the Victorian Tertiaries," under the auspices of the Commonwealth Government, the following series of new forms from the East Gippsland Area is described. Most of these are affording valuable evidence in the discrimination of zones, especially in the older part of the Tertiary Series, and in the main are restricted to the Gippsland area.

Genus *Cyclammina* H. B. Brady, 1876.

CYCLAMMINA ROTUNDATA, sp. nov.

(Plate V, Figs 1, 2.)

Haplophragmoides latidorsatum (non Born.) Chapman, 1904, p. 227, pl. xx, fig. 1.

Description of Holotype.—Test subglobular, depressed in umbilical area; peripheral margin, especially in later portion, well rounded, about 8 sutures visible on the last whorl. Aperture a narrow arched slit at base of the septal face, with cancellation on the surface. Aperture always more or less oblique. Shell texture moderately finely arenaceous, colour varying from white to grey.

Dimensions.—Greatest diameter of test, 1.4 mm.; greatest width, 0.82 mm.

Paratype.—From 1165 ft. No. 1 Bore, Parish of Bumberrah (Metung), shows a less depressed umbilical area, and coarser arenaceous structure.

Observations.—The specimen figured previously by one of us from the ochreous clay from Brown's Creek, Otway Coast (loc. supra cit.), is here regarded as a species of *Cyclammina*, the type specimen of which was obtained from deep borings in Gippsland. In the first place it differs from *Haplophragmoides latidorsatum* of authors later than Bornemann, and also from *Haplophragmoides*

subglobosum of Sars, by the less inflated chambers and the cancellated structure of the test. *Cyclammina rotundata* is less depressed than *C. incisa* (Stache), and is generally a smaller form with fewer chambers. It is often accompanied by *C. incisa*.

Occurrence.—No. 1 Bore, Parish of Bumberrah (Metung) at 1165, 1240, and 1295 feet; No. 3 Bore, Darriman at 1189 feet; No. 5 Bore, Parish of Glencoe, at 430 feet.

CYCLAMMINA LONGICOMPRESSA, sp. nov.

(Plate V, Figs. 3, 4.)

Description of Holotype.—Test spiral, ovately lengthened towards the termination of the last whorl. Surface somewhat compressed, whorls involute with a small umbilical depression. Chambers few, about 7 in the whorl. Sutures not deeply impressed; periphery sub-acute, aperture narrow; arched slit, rather oblique, the last chamber has a flat septal face; colour generally white; structure arenaceous, with a medium texture.

Dimensions.—Longest diameter of holotype, 2 mm.; shortest diameter, 1.3 mm.; thickness of test, 0.86 mm.

Observations.—This form of *Cyclammina* might be regarded as a distorted variety of *C. incisa*, but for the fact that it appears to be a constant form in the deep parts of the borings in the Victorian Tertiaries. It has also been met with in the Brown's Creek material from the Aire Coast.

Occurrence.—No. 4 Bore, Parish of Glencoe at 230 feet, and in No. 5 Bore at 486 feet; No. 3 Bore, Parish of Darriman, at 1207 feet; also from Brown's Creek, Aire Coast.

Genus *Lingulina* d'Orbigny, 1826.

LINGULINA BARTRUMI Chapman var. METUNGENSIS, nov.

(Plate V, Fig. 5.)

Lingulina bartrumi Chapman, 1926, p. 54, pl. xi, figs. 12a,b.

Description of Holotype.—Test broadly ovate, bluntly pointed at extremities, compressed at the sides and on the distal margin of the last chamber. Segments number four, the height of the last almost equal to the previous three. Surface of chambers delicately striate. Aperture is a short slit-like orifice at the apex of the last chamber.

Dimensions.—Length of test, 4.8 mm.; greatest breadth, 1.5 mm.; height of last chamber, 1.18 mm.

Observations.—This variety resembles the New Zealand species *L. bartrumi* in its general characters, but there are varietal differences which make it necessary to refer to it as a variety. The differences seen in the Metung specimens consist in the wider chambers, in the more arched sutures, and greater compression of the border of the last chamber. The type series from New Zealand

occurred in the Upper Eocene grey marls at Weka Creek; in the Oligocene of Waikato South Head; North Head, Kaawa Creek; and south of Port Waikato.

Occurrence.—No. 1 Bore, Parish of Bumberrah (Metung), at 895 and 1320 feet.

Genus *Vaginulina* d'Orbigny, 1826.

VAGINULINA GIPPSLANDICA, sp. nov.

(Plate V, Fig. 6.)

Description of Holotype.—Test linear, elongate, slightly curved, marginuline in general form but strongly compressed. Proloculum rounded, half enclosed by the second chamber; the ten succeeding chambers low and more or less oblique. Surface of test ornamented with a series of strong partially interrupted costae, about 11 showing on each side of the penultimate chamber, the last chamber somewhat inflated and nearly smooth. Aperture sub-circular situated on the concave side of the test at the end of a short spout-like prolongation. The above extremity terminates in a short blunt spinous process.

Dimensions.—Length, 4.2 mm.; greatest width, 1.04 mm.

Observations.—This species is quite a typical form in the lower part of the Tertiary series in the borings in Gippsland. The characters of the species are fairly constant. In ornament it bears certain resemblance to the *Marginulina costata* type, and in general shape with that of *Vaginulina legumen*. The compression of the test shows it to belong to the genus *Vaginulina*. A somewhat related form is the *Marginulina asprocostulata* (Stache, 1864, pl. xxii, fig. 53), but our species differs in being elliptical in section and in having the costulation finer, more oblique and somewhat interrupted.

Occurrence.—No. 3 Bore, Parish of Darriman, at 1189 feet; Parish of Glencoe, No. 3 Bore, at 180 feet, 190 feet, 200 feet and 210 feet; No. 4 Bore, at 240 feet and 260 feet, and No. 5 at 450 feet; No. 1 Bore, Parish of Bumberrah (Metung), at 1180 feet, 1240 feet and 1320 feet. The species will apparently prove a good zonal fossil since at present it occurs only in the basal beds of the Tertiary series proved by the bores in Gippsland.

Genus *Carpenteria* Gray, 1858.

CARPENTERIA ROTALIFORMIS, sp. nov.

(Plate V, Figs. 7, 8.)

Carpenteria proteiformis Goës (*pars*): Chapman, 1913, p. 171, pl. xvi, fig. 7.

Description of Holotype.—Test suborbicular, convex on one side, somewhat flattened on the opposite. The aperture occurs in the periphery. Point of attachment very small, usually on the flattened surface. Test consists of a rudely coiled system about 5 chambers. Surface papillate.

Dimensions.—Width of holotype, 1.7 mm.; height, 1.3 mm.

Observations.—The figured specimen from the Mallee borings referred to above (Paratype in National Museum, No. 12428) undoubtedly belongs to this varietal form. At the time it was remarked upon as follows:—"The specimens from the polyzoal rock of the Mallee borings are invariably arrested in growth, showing only the first tier of segments above the primordial group."

Occurrence.—No. 3 Bore, Parish of Darriman at 939, 1079 and 1109 feet; Parish of Glencoe, Bores No. 2 at 813 feet, No. 3 at 180 feet; No. 4 at 158-160 and 240 feet, No. 5 at 150 feet; No. 1 Bore, Parish of Bumberrah (Metung) at 984, 1020 and 1040 feet. In the Mallee it occurred in Bore 11 at 540-542 feet; 544-546 feet and 560-562 feet.

CARPENTERIA ALTERNATA, sp. nov.

(Plate V, Figs. 9, 10.)

Description of Holotype.—Test conoidal, chambers sub-globular, sometimes depressed increasing in size from the apical attached surface and arranged in a more or less alternating series, sutures deeply impressed. Surface of test moderately smooth. Aperture crescentic to sub-circular, partially surrounded by a neck-like process. The aboral extremity usually concave, indicating an impressed surface of attachment. Another specimen figured (Paratype) shows a similar alternating series, but with the test more generally compressed.

Dimensions.—Length of holotype, 1.8 mm.; greatest width, 1.5 mm.

Observations.—In the structure of the shell this species resembles *Carpenteria proteiformis*, but the constant character of a series of specimens enables us to separate these short forms with a textularian growth from the latter species.

Occurrence.—No. 5 Bore, Parish of Glencoe, at 150 feet.

Genus *Lamarckina* Berthelin, 1881.

LAMARCKINA GLENCOENSIS, sp. nov.

(Plate V, Figs. 11, 12).

Description of Holotype.—Test elongate ovate. Superior face flattened. Whorls entirely exposed, consisting of 2 whorls, the outer one consisting of about 8 chambers and enlarging rapidly. Sutures thickened. Surface ornamented with closely set pustules. Inferior face showing about two-thirds of last whorl, surface somewhat smooth. Aperture on inferior surface wide and partially closed by a semicircular flap. Periphery of test bluntly carinate along the inner septal edge.

Dimensions.—Greatest length, 0.95 mm; width, 0.77 mm.; greatest thickness, 0.68 mm.

Observations.—In its general form and tuberculated surface our species resembles *Lamarckina rugulosa* (Cushman, Plummer MS., 1926, p. 8, pl. iii, fig. 6a-c) with a distinction that in the latter the inner whorl does not carry so far, and no septation is visible after the first outer chamber or so. In our specimen, the limba-tion of the chambers of the inner whorl is a marked feature. *Lamarckina rugulosa* occurred in the lower Eocene of Midway, Texas and in the Clayton, Mississippi.

Occurrence.—No. 3 Bore, Parish of Glencoe at 100 feet, and No. 5 Bore at 387 feet.

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Explanation of Plate V.

- Fig. 1.—*Cyclammia rotundata*, sp. nov. No. 1 Bore, Parish of Bumberrah (Metung), 1295 feet. Holotype. $\times 22$.
- Fig. 2.—*C. rotundata*, sp. nov. Metung, 1165 feet. Paratype. $\times 12$.
- Fig. 3.—*C. longicompressa*, sp. nov. No. 4 Bore, Parish of Glencoe, 230 feet. Holotype, lateral aspect. $\times 22$.
- Fig. 4.—*C. longicompressa*, sp. nov. No. 4 Bore, Parish of Glencoe, 230 feet. Apertural aspect of another specimen. (Paratype). $\times 22$.
- Fig. 5.—*Lingulina bartrumi* Chapman var. *metungensis*, nov. No. 1 Bore, Parish of Bumberrah (Metung), 1320 feet. Holotype, natural aspect. $\times 15$.
- Fig. 6.—*Vaginulina gippslandica*, sp. nov. No. 3 Bore, Parish of Glencoe, 180 feet. Holotype, natural aspect. $\times 14$.
- Fig. 7.—*Carpenteria rotaliformis*, sp. nov. No. 1 Bore, Parish of Bumberrah (Metung), 1020 feet. Holotype, superior surface. $\times 14$.
- Fig. 8.—*C. rotaliformis*, sp. nov. Ditto. Holotype, inferior surface. $\times 14$.
- Fig. 9.—*Carpenteria alternata*, sp. nov. No. 5 Bore, Parish of Glencoe, 150 feet. Holotype. $\times 18$.
- Fig. 10.—*C. alternata*, sp. nov. Ditto. Paratype. $\times 18$.
- Fig. 11.—*Lamarckina glencocensis*, sp. nov. No. 3 Bore, Parish of Glencoe, 1000 feet. Holotype, superior surface. $\times 28$.
- Fig. 12.—*L. glencocensis*, sp. nov. Ditto. Inferior surface of another specimen. Paratype. $\times 28$.

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